

WHAT IS CLAIMED IS:

1. A method for controlling an aperture of a camera, comprising the steps of:
  - determining an aperture out of an aperture range for a normal shooting which secures predetermined optical capability; and
  - controlling a diaphragm mechanism to use said aperture for at least one of the following: automatic exposure, auto focus, electronic zoom, real-time displaying of a moving image, recording of a moving image, and recording an image with a low resolution due to reduced pixels.
2. An apparatus for controlling an aperture of a camera, comprising:
  - a first determining device that determines an aperture range for a normal shooting which secures predetermined optical capability;
  - a second determining device that determines an aperture range including an aperture out of the aperture range for the normal shooting; and
  - a controlling device that controls a diaphragm mechanism to set an aperture within the aperture range determined by said second determining device for at least one of automatic exposure and auto focus, and controls the diaphragm mechanism to set an aperture within the aperture range determined by said first determining device for recording of an image.
3. An apparatus for controlling an aperture of a camera, comprising:
  - a first determining device that determines an aperture range for a normal shooting which secures predetermined optical capability;
  - a second determining device that determines an aperture range including an aperture out of the aperture range for the normal shooting; and
  - a controlling device that controls a diaphragm mechanism to set an aperture within the aperture range determined by said second determining device for a shooting with electronic zoom, and controls the diaphragm mechanism to set an aperture within the aperture range determined by said first determining device for a shooting without the electronic zoom.
4. An apparatus for controlling an aperture of a camera, comprising:
  - a first determining device that determines an aperture range for a normal shooting which secures predetermined optical capability;

a second determining device that determines an aperture range including an aperture out of the aperture range for the normal shooting; and

a controlling device that controls a diaphragm mechanism to set an aperture within the aperture range determined by said first determining device for recording of a still image, and controls the diaphragm mechanism to set an aperture within the aperture range determined by said second determining device for at least one of real-time displaying of a moving image and recording of a moving image.

5. An apparatus for controlling an aperture of a camera, comprising:

a first determining device that determines an aperture range for a normal shooting which secures predetermined optical capability;

a second determining device that determines an aperture range including an aperture out of the aperture range for the normal shooting; and

a controlling device that controls a diaphragm mechanism to set an aperture within the aperture range determined by said first determining device for a shooting in a high-resolution mode with a large number of pixels, and controls the diaphragm mechanism to set an aperture within the aperture range determined by said second determining device for a shooting in a low-resolution mode with a small number of pixels.

6. A camera, comprising:

a taking lens;

a diaphragm mechanism that adjusts an amount of light which enters the camera through said taking lens;

a first determining device that determines an aperture range for a normal shooting which secures predetermined optical capability;

a second determining device that determines an aperture range including an aperture out of the aperture range for the normal shooting; and

a controlling device that controls the diaphragm mechanism to set an aperture within the aperture range determined by said second determining device for at least one of automatic exposure and auto focus, and controls the diaphragm mechanism to set an aperture within the aperture range determined by said first determining device for recording of an image.

7. A camera, comprising:
  - a taking lens;
  - a diaphragm mechanism that adjusts an amount of light which enters the camera through said taking lens;
  - an imaging device that converts the light, entering the camera through said taking lens and said diaphragm mechanism, into electric signals;
  - an electronic zoom processing device that produces an enlarged image of a partial area corresponding with the center of a screen by using signals of the area corresponding with the center of the screen among image signals outputted from said imaging device;
  - an operating device for selecting presence of using said electronic zoom processing device;
  - a storage device for storing image data obtained through said imaging device in a storage medium;
  - a first determining device that determines an aperture range for a normal shooting which secures predetermined optical capability;
  - a second determining device that determines an aperture range including an aperture out of the aperture range for the normal shooting; and
  - a controlling device that controls the diaphragm mechanism to set an aperture within the aperture range determined by said second determining device for a shooting with the electronic zoom processing device, and controls the diaphragm mechanism to set an aperture within the aperture range determined by said first determining device for a shooting without the electronic zoom processing device.

8. The camera as defined in claim 7, further comprising:
  - a magnification designating device for designating a magnification in said electronic zoom processing device; and
  - an aperture changing device that changes the aperture out of the aperture range according to the magnification designated with said magnification designating device.

9. A camera, comprising:
  - a taking lens;
  - a diaphragm mechanism that adjusts an amount of light which enters the camera

through said taking lens;

an imaging device that converts the light, entering the camera through said taking lens and said diaphragm mechanism, into electric signals;

an output device that displays an image on a display device according to image data inputted through said imaging device;

a storage device that stores the image data in a storage medium;

a first determining device that determines an aperture range for a normal shooting which secures predetermined optical capability;

a second determining device that determines an aperture range including an aperture out of the aperture range for the normal shooting; and

a controlling device that controls the diaphragm mechanism to set an aperture within the aperture range determined by said first determining device for recording of a still image, and controls the diaphragm mechanism to set an aperture within the aperture range determined by said second determining device for at least one of real-time displaying of a moving image and recording of a moving image.

10. A camera, comprising:

a taking lens;

a diaphragm mechanism that adjusts an amount of light which enters the camera through said taking lens;

an imaging device that converts the light, entering the camera through said taking lens and said diaphragm mechanism, into electric signals;

a storage device that stores the image data in a storage medium;

a first determining device that determines an aperture range for a normal shooting which secures predetermined optical capability;

a second determining device that determines an aperture range including an aperture out of the aperture range for the normal shooting;

a resolution designating device for designating a resolution in image recording; and

a controlling device that controls a diaphragm mechanism to set an aperture within the aperture range determined by said first determining device when the resolution designating device designates a high-resolution mode with a large number of pixels, and controls the diaphragm mechanism to set an aperture within the aperture range determined by said second

determining device when the resolution designating device designates a low-resolution mode with a small number of pixels.

11. The camera as defined in claim 10, further comprising an aperture changing device that changes the aperture outside the aperture range according to the number of pixels designated with the resolution designating device that chooses one of resolutions.

12. A method for controlling an aperture of a camera, wherein:

the aperture is controlled within a first aperture range for a normal shooting without an electronic flash; and

the aperture is controlled within a second aperture range for an electronic flash shooting with the electronic flash.

13. The method for controlling the aperture of the camera as defined in claim 12, wherein:

a subject distance is determined; and

the aperture is controlled within the second aperture range when the subject distance is longer than a predetermined distance.

14. The method for controlling the aperture of the camera as defined in claim 12, wherein:

pre-emitting for illuminating a subject is performed before exposure;

photometry is performed for each area of a divided taking screen; and

it is determined whether to use the second aperture range according to results of the photometry.

15. The method for controlling the aperture of the camera as defined in claim 12, wherein the aperture is controlled within the second aperture range when a wide conversion lens is attached to the camera.

16. A method for controlling an aperture of a camera, comprising the steps of:

determining an aperture out of an aperture range for a normal shooting which secures

predetermined optical capability; and

controlling a diaphragm mechanism to use said aperture according to a shooting mode selected.

17. The method for controlling the aperture of the camera as defined in claim 16, wherein the aperture is used when a portrait mode is selected as the shooting mode.
  18. A method for controlling a taking lens of a camera that forms a subject image on an imaging surface, comprising the steps of:
    - changing a resolution of an image with a resolution changing device;
    - determining a first range and a second range of the taking lens; and
    - controlling the taking lens within the first range for a shooting with a high resolution, and controlling the taking lens within the second range for a shooting with a low resolution.
  19. A method for controlling a taking lens of a camera with an imaging device that converts a subject image into electric signals, the method comprising the steps of:
    - determining a first range and a second range of the taking lens; and
    - controlling the taking lens within the first range for a normal shooting without an electronic zooming, and controlling the taking lens within the second range for an electronic zoom shooting with the electronic zooming.
  20. A method for controlling a taking lens of a camera that forms a subject image on an imaging surface, the method comprising the steps of:
    - changing a resolution of an image with a resolution changing device;
    - determining a first focal-length range of the taking lens and a second focal-length range of the taking lens; and
    - controlling a focal length of the taking lens within the first focal-length range for a shooting with a high resolution, and controlling the focal length of the taking lens within the second focal-length range for a shooting with a low resolution.
  21. A method for controlling a taking lens of a camera with an imaging device that converts a subject image into electric signals, the method comprising the steps of:

determining a first focal-length range of the taking lens and a second focal-length range of the taking lens; and

controlling a focal length of the taking lens within the first focal-length range for a normal shooting without an electronic zooming, and controlling the focal length of the taking lens within the second focal-length range for an electronic zoom shooting with the electronic zooming.

22. A method for controlling an aperture of a camera, comprising the steps of:
  - storing optical data related to a taking lens;
  - determining an amount of vibration of the camera; and
  - comparing the amount of the vibration with the optical data and changes the aperture according to a result of comparison.
23. An apparatus for controlling an aperture of a camera, comprising:
  - a first aperture range determining device that determines an aperture range;
  - a second aperture range determining device that determines an aperture range; and
  - a controlling device that controls a diaphragm mechanism to set the aperture within the aperture range determined by the first aperture range determining device for a normal shooting without an electronic flash, and controls the diaphragm mechanism to set the aperture within the aperture range determined by the second aperture range determining device for an electronic flash shooting with the electronic flash.
24. The apparatus for controlling the aperture of the camera as defined in claim 23, wherein said controlling device uses the second aperture range determining device when a subject distance is longer than a predetermined length.
25. The apparatus for controlling the aperture of the camera as defined in claim 23, further comprising:
  - a pre-emitting device that illuminates a subject before exposure;
  - a photometry device that performs photometry for area of a divided taking screen when the pre-emitting device emits light; and
  - a determining device that determines whether to use the second aperture range

determining device according to results of the photometry by said photometry device.

26. The apparatus for controlling the aperture of the camera as defined in claim 23, wherein said controlling device uses the second aperture range determining device when a detecting device detects that a wide conversion lens has been attached to the camera.
  27. An apparatus for controlling an aperture of a camera, comprising:
    - a first determining device that determines an aperture range for a normal shooting which secures predetermined optical capability;
    - a second determining device that determines an aperture range including an aperture out of the aperture range for the normal shooting; and
    - a controlling device that controls a diaphragm mechanism to set the aperture within the aperture range determined by said second determining device for the normal shooting according to a shooting mode selected.
  28. The apparatus for controlling the aperture of the camera as defined in claim 27, wherein the controlling device uses said second determining device when a portrait mode is selected as the shooting mode.
  29. An apparatus for controlling a taking lens of a camera that forms a subject image on an imaging surface, said apparatus comprising:
    - a first determining device that determines a range for a shooting with a high resolution;
    - a second determining device that determines a range for a shooting with a low resolution; and
    - a controlling device that controls the taking lens within the range determined by said first determining device for the shooting with the high resolution, and controls the taking lens within the range determined by said second determining device for the shooting with the low resolution.
  30. An apparatus for controlling a taking lens of a camera with an imaging device that converts a subject image into electric signals, said apparatus comprising:

a first determining device that determines a range of the taking lens for a normal shooting without an electronic zooming;

a second determining device that determines a range of the taking lens for an electronic zoom shooting with the electronic zooming; and

a controlling device that controls the taking lens within the range determined by the first determining device for the normal shooting, and controls the taking lens within the range determined by the second determining device for the electronic zoom shooting.

31. An apparatus for controlling a taking lens of a camera that forms a subject image on an imaging surface, said apparatus comprising:

a first determining device that determines a focal-length range for a shooting with a high resolution;

a second determining device that determines a focal-length range for a shooting with a low resolution; and

a controlling device that controls the taking lens within the focal-length range determined by said first determining device for the shooting with the high resolution, and controls the taking lens within the focal-length range determined by said second determining device for the shooting with the low resolution.

32. An apparatus for controlling a taking lens of a camera with an imaging device that converts a subject image into electric signals, said apparatus comprising:

a first determining device that determines a focal-length range of the taking lens for a normal shooting without an electronic zooming;

a second determining device that determines a focal-length range of the taking lens for an electronic zoom shooting with the electronic zooming; and

a controlling device that controls the taking lens within the focal-length range determined by the first determining device for the normal shooting, and controls the taking lens within the focal-length range determined by the second determining device for the electronic zoom shooting.

33. An apparatus for controlling a taking lens of a camera, comprising:

a vibration amount determining device that determines an amount of vibration of the

camera;

a storing device that stores optical data related to said taking lens; and  
a controlling device that compares the amount of vibration determined by the vibration amount determining device with said optical data, and changes the aperture according to a result of comparison.

34. A camera, comprising:

a diaphragm mechanism that adjusts an amount of light entering the camera through a taking lens;

an electronic flash that emits auxiliary light to a subject at an exposure;

a first determining device that determines an aperture range for a normal shooting without the electronic flash; and

a second determining device that determines an aperture range for an electronic flash shooting with the electronic flash.

35. The camera as defined in claim 34, further comprising:

a photometry device that measures a subject distance,

wherein the camera uses said second determining device when the subject distance is longer than a predetermined distance.

36. The camera as defined in claim 34, further comprising:

a pre-emitting device that illuminating the subject by emitting light before the exposure;

a photometry device that performs photometry for each area of a divided taking screen when said pre-emitting device emits the light; and

a determining device that determines whether to use said second determining device according to a result of the photometry by said photometry device.

37. The camera as defined in claim 34, further comprising:

an attaching part for a wide conversion lens; and

a detecting device for detecting attachment of the wide conversion lens to said attaching part,

wherein the camera uses said second determining device when the wide conversion lens is attached to the attaching part.

38. A camera, comprising:

a taking lens;

a diaphragm mechanism that adjusts an amount of light entering the camera through a taking lens;

a first determining device that determines an aperture range for a normal shooting which secures predetermined optical capability;

a second determining device that determines an aperture range including an aperture out of the aperture range for the normal shooting;

a shooting mode setting device that sets a shooting mode; and

a controlling device that controls the diaphragm mechanism to set an aperture within the aperture range according to the shooting mode selected by said shooting mode setting device.

39. The camera as defined in claim 38, wherein the controlling device uses said second determining device when a portrait mode is selected by said shooting mode setting device.

40. A camera, comprising:

a taking lens that forms a subject image on an imaging surface;

a taking lens controlling device that adjusts a position of the taking lens;

a resolution changing device that changes a resolution of an image;

a first determining device that determines an area of the taking lens for a shooting with a high resolution; and

a second determining device that determines an area of the taking lens for a shooting with a low resolution.

41. A camera, comprising:

a taking lens;

an imaging device that changes an optical image of a subject which enters the camera through the taking lens into electric signals;

an electronic zooming device that obtains an enlarged image by electronically processing image signals obtained through said imaging device;

a taking lens controlling device that adjusts a position of said taking lens;

a first determining device that determines a range of the taking lens for a normal shooting without the electronic zooming device; and

a second determining device that determines a range of the taking lens for an electronic zooming with the electronic zooming device.

42. A camera, comprising:

a taking lens;

an imaging device that changes an optical image of a subject which enters the camera through the taking lens into electric signals;

a focal length controlling device that adjusts a focal length of said taking lens;

a resolution changing device that changes a resolution of an image;

a first determining device that determines a focal-length area of the taking lens for a shooting with a high resolution; and

a second determining device that determines a focal-length area of the taking lens for a shooting with a low resolution.

43. A camera, comprising:

a taking lens;

an imaging device that changes an optical image of a subject which enters the camera through the taking lens into electric signals;

an electronic zooming device that obtains an enlarged image by electronically processing image signals obtained through said imaging device;

a focal length controlling device that adjusts a focal length of said taking lens;

a first determining device that determines a focal-length area of the taking lens for a normal shooting without the electronic zooming device; and

a second determining device that determines a focal-length area of the taking lens for an electronic zooming shooting with the electronic zooming device.

44. A camera, comprising:

a taking lens;  
a diaphragm mechanism that adjusts an amount of light entering the camera through the taking lens;  
a vibration amount determining device that determines an amount of vibration of the camera;  
a storing device that stores optical data related to said taking lens; and  
a controlling device that compares the amount of vibration determined by said vibration amount determining device with said optical data, and changes an aperture according to a result of comparison.

45. A method for controlling an edging, wherein:

a camera comprises an imaging device that changes an optical image of a subject which enters the camera through a taking lens into electric signals, and an edging device that performs the edging for an image obtained by the imaging device; and  
a control amount for deciding a degree of the edging said edging device is changed in response to one of the conditions: an aperture, a position of said taking lens, and a focal length of said taking lens.

46. An apparatus for controlling an edging, wherein:

a camera comprises an imaging device that changes an optical image of a subject which enters the camera through a taking lens into electric signals, and an edging device that performs the edging for an image obtained by the imaging device; and  
a control amount for deciding a degree of the edging said edging device is changed in response to one of the conditions: an aperture, a position of said taking lens, and a focal length of said taking lens.

47. A camera, comprising:

a taking lens;  
an imaging device that changes an optical image of a subject which enters the camera through a taking lens into electric signals;  
an edging device that performs the edging for an image obtained by the imaging device; and

a controlling device that controls the edging device by changing a control amount for deciding a degree of the edging said edging device in response to one of the following conditions: an aperture, a position of said taking lens, and a focal length of said taking lens.

48. A solid-state imaging device in which a large number of photoelectric converting devices are arranged and a micro lens is arranged at a front part of each of the photoelectric converting devices,

wherein an aperture rate of each micro lens is changed in accordance with a position of the micro lens.

49. The solid-state imaging device as defined in claim 48, wherein said aperture rate is smaller toward periphery of a receiving surface of the solid-state imaging device.